UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/761,047	01/20/2004	Stephen R. Van Doren	200313631-1	1166

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EXAMINER
BURGESS, BARBARA N

ART UNIT	PAPER NUMBER
2157	

DATE MAILED: 06/15/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

	Application No.	Applicant(s)
Office Action Summary	10/761,047	VAN DOREN ET AL.
	Examiner	Art Unit	
	Barbara N. Burgess	2157	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>*20 January 2004*</u>.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-38* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-38* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All   b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *1-20-04*.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that

form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2.   Claims 1-38 are rejected under 35 U.S.C. 102(e) as being anticipated by Cypher

(US Patent 6,877,056 B2).

As per claims 1, 29, and 34, Cypher discloses a system and method comprising:

- A first node that provides a broadcast request for data, the first node receiving a

  read conflict response to the broadcast request from the first node, the read conflict

  response indicating that a second node has a pending broadcast read request for

  the data (column 6, lines 40-50, column 14, lines 35-50, column 20, lines 20-60);

- A third node that provides the requested data to the first node in response to the

  broadcast request from the first node, the first node filling the data provided by the

  third node in a cache associated with the first node (column 21, lines 25-40).

As per claim 2, Cypher discloses the system of claim 1, wherein the broadcast request

provided by the first node is a source broadcast read request (column 8, lines 45-57).

As per claim 3, Cypher discloses the system of claim 2, wherein the first node provides a read conflict response to the broadcast read request from the second node, the read conflict response provided by the first node indicating that the broadcast read request of the first node conflicts with the pending broadcast read request of the second node (column 15, lines 1-18).

As per claim 4, Cypher discloses the system of claim 3, wherein the third node provides the requested data to the second node in response to the broadcast read request from the second node, the second node filling the data provided by the third node in a cache associated with the second node (column 22, lines 38-49).

As per claim 5, Cypher discloses the system of claim 1, wherein the request for data broadcast by the first node is a source broadcast write request (column 17, lines 15-30).

As per claim 6, Cypher discloses the system of claim 5, wherein the first node provides a second conflict response to the pending broadcast read request from the second node, the second conflict response provided by the first node indicating that the write request broadcast by the first node conflicts with the broadcast read request from the second node (column 23, lines 25-48).

As per claim 7, Cypher discloses the system of claim 6, wherein the broadcast request provided by the first node is broadcast using a first cache coherency protocol, the second node in response to the second conflict response provided by the first node reissues the pending broadcast read request of the second node (column 21, lines 33-44).

As per claim 8, Cypher discloses the system of claim 7, wherein the first cache coherency protocol is a source broadcast cache coherency protocol and the second node reissues the broadcast read request using a forward progress cache coherency protocol (column 9, lines 11-19).

As per claim 9, Cypher discloses the system of claim 6, wherein the third node provides the requested data to the second node in response to the pending broadcast read request of the second node, the second conflict response provided by the first node preventing the second node from filling the data provided by the third node in a cache associated with the second node (column 19, lines 50-67).

As per claim 10, Cypher disclose the system of claim 6, wherein the third node provides shared data to the second node in response to the pending broadcast read request of the second node, the second node filling a cache associated with the second node with the shared data and associating an invalid state with the shared data filled in the cache associated with the second node (column 23, lines 23-45).

As per claim 11, Cypher discloses the system of claim 1, wherein the third node

comprises one of a home node and an owner node (column 5, lines 12-28).

As per claim 12, Cypher discloses the system of claim 1, wherein the broadcast request

provided by the first node is broadcast using a source broadcast cache coherency

protocol (column 13, lines 40-58).

As per claim 13, Cypher discloses the system of claim 1, wherein the first node defines

a first processor and the second node defines a second processor, the first and second

processors having an associated cache, the associated caches of the first and second

processors each comprising a plurality of cache lines, each cache line having a

respective tag address that identifies associated data and each cache line having state

information that indicates a state of the associated data for the respective cache line,

the first and second processors being capable of communicating with each other and

with other nodes of the system tllrough an interconnect (column 25, lines 1-38).

As per claim 14, Cypher discloses the system of claim 13, further comprising a first

cache controller associated with the first processor and a second cache controller

associated with the second processor, the first cache controller being operative to

manage data requests and responses for the associated cache of the first processor,

the first cache controller effecting state transitions associated with the data in the

associated cache of the first processor based on the data requests and responses for

the associated cache of the first processor, the second cache controller being operative

to manage data requests and responses for the associated cache of the second

processor, the second cache controller effecting state transitions associated with the

data in the associated cache of the second processor based on the data requests

and responses for the associated cache of the second processor (column 12, lines 34-

50).

As per claim 15, Cypher discloses the system of claim 13, wherein the system

implements a hybrid cache coherency protocol wherein each of the first, second, and

third processors employs a source broadcast-based protocol to issue a request for the

data and provide responses for the data, and employs an associated second protocol to

reissue a request for the data in response to the request failing in the source broadcast

protocol, the second protocol employing a forward progress technique (column 20, lines

50-60).

As per claims 16, 24, Cypher discloses a multi-processor network and computer system

comprising:

- A first processor node operative to issue a first source broadcast request for data
  (column 12, lines 23-39);

- A second processor node operative to issue a second source broadcast request for
  the data (column 12, lines 45-55);

- A third node operative to provide a data response in response to the respective source broadcast requests of the first and second processor nodes, the third node being one of an owner processor node and a memory node (column 18, lines 1-12);

- The second processor node being operative to provide a read conflict response to the first source broadcast request when the second source broadcast request is a read request, the second processor node being operative to provide a second conflict response to the first source broadcast request when the second source broadcast request is a write request (column 21, lines 30-45);

- The first processor node being operative in response to receiving a read conflict response from the second processor to implement a cache with the data provided by the third node (column 22, lines 25-46).

As per claim 17, Cypher discloses the multi-processor network of claim 16, wherein the first processor node is operative in response to a write conflict response from the second processor node to issue a request for the data using a forward progress technique (column 24, lines 12-45).

As per claim 18, Cypher discloses the multi-processor network of claim 17, wherein the second conflict response from the second processor node prevents the first processor node from implementing the cache with the data provided by the third node (column 25, lines 18-34).

As per claim 19, Cypher discloses the multi-processor network of claim 16, wherein the

first source broadcast request is one of a source broadcast write request and a source

broadcast read request (column 9, lines 35-56).

As per claim 20, Cypher discloses the multi-processor network of claim 16, wherein the

source broadcast request issued by the first processor node exists concurrently with the

source broadcast request issued by the second processor node (column 15, lines 25-

55).

As per claim 21, Cypher discloses the multi-processor network of claim 16, wherein the

third processor node provides shared data to the second processor node in response to

the second processor node providing the second source broadcast request as a

broadcast read request, the second processor node filling the shared data in a cache

associated with the second processor node and associating an invalid state with the

data in the cache associated with the second processor node (column 28, lines 22-46).

As per claim 22, Cypher discloses the multi-processor network of claim 16, wherein

each of the first, second, and third processor nodes has an associated cache that

comprises a plurality of cache lines, each cache line having a respective tag address

that identifies associated data and having state information that indicates a state of the

associated data for the respective cache line, the first, second, and third processor

nodes being capable of communicating with each other and with other nodes of the

system through an interconnect, the multi-processor network further comprising a first

cache controller associated with the first processor node, a second cache controller

associated with the second processor node, and a third cache controller associated with

the third processor node, the first cache controller being operative to manage data

requests and responses for the associated cache of the first processor, the first cache

controller effecting state transitions associated with the data in the associated cache of

the first processor based on the data requests and responses for the associated cache

of the first processor, the second cache controller being operative to manage data

requests and responses for the associated cache of the second processor, the second

cache controller effecting state transitions associated with the data in the associated

cache of the second processor based on the data requests and responses for the

associated cache of the second processor, the third cache controller being operative to

manage data requests and responses for the associated cache of the third processor,

the third cache controller effecting state transitions associated with the data in the

associated cache of the third processor based on the data requests and responses for

the associated cache of the third processor (column 20, lines 45-67, column 21, lines 1-

44, column 22, lines 27-49).

As per claim 23, Cypher discloses the multi-processor network of claim 16, wherein the

network implements a hybrid cache coherency protocol in which each of the first,

second, and third processor nodes employs a source broadcast-based protocol to issue

requests for data and provide responses to requests, and employs an associated

protocol employing a forward progress technique to reissue a request for data in response to a request failing in the source broadcast protocol (column 29, lines 20-30).

As per claim 25, Cypher discloses the computer system of claim 24, wherein the first processor in response to the second conflict response of the second processor is operative to reissue the source broadcast request from the first processor by issuing a request for the data employing a forward progress protocol (column 20, lines 19-33).

As per claim 26, Cypher discloses the computer system of claim 24, wherein the second conflict response from the second processor prevents the first processor from filling the data provided by the third processor in the cache associated with the first processor (column 22, lines 45-67).

As per claim 27, Cypher discloses the computer system of claim 24, wherein the third processor provides a shared data response to the first processor in response to the source broadcast request for the data, the first processor being operative to place the shared data in the cache associated with the first processor and associate an invalid state with the data in the cache associated with the first processor (column 27, lines 15-40).

As per claim 28, Cypher discloses the computer system of claim 24, wherein the computer system implements hybrid cache coherency protocol in which each of the first,

second, and third processor employs a source broadcast-based protocol to issue

requests for data and provide responses to requests, and employs an associated

protocol employing a forward progress technique to reissue a request for data in

response to a request failing in the source broadcast protocol (column 12, lines 32-50).

As per claim 30, Cypher discloses the system of claim 29, wherein the means for

providing a broadcast request from the first node comprises means for providing a

broadcast read request for the data from the first node, the system further comprising:

• Means for providing a read conflict response from the first node to the second node

in response to the broadcast read request of the second node, the read conflict

response from the first node indicating that the pending broadcast read request of the

second node conflicts with the broadcast read request for the data from the first node

(column 20, lines 33-56);

• Means for providing the requested data to the second node from the third node in

response to the broadcast read request of the second node (column 21, lines 10-35);

• Means for filling the data provided to the second node by the third node in a cache

associated with the second node in response to the second node receiving the read

conflict response from the first node (column 22, lines 30-55).

As per claim 31, Cypher discloses the system of claim 29, wherein the means providing

a broadcast request from the first node comprises means for providing a broadcast write

request for the data from the first node, the system further comprising:

- Means for providing a second conflict response from the first node to the second node in response to the pending broadcast read request of the second node, the second conflict response from the first node indicating that the pending broadcast read request of the second node conflicts with the broadcast write request for the data from the first node (column 18, lines 14-39);

- Means for reissuing the broadcast read request of the second node employing a forward progress protocol in response to the second conflict response provided by the first node (column 19, lines 10-27).

As per claim 32, Cypher disclose the system of claim 31, further comprising means for preventing the second node from placing the data provided by the third node in a cache associated with the second node in response to the second conflict response provided by the first node (column 10, lines 22-45).

As per claim 33, Cypher discloses the system of claim 29, wherein the means for providing the data from the third node to the first node is operative to provide shared data to the first processor, the means for placing the data provided by the third node placing the shared data in the cache associated with the first processor, the system further comprising means for associating an invalid state with the data in the cache associated with the first processor (column 25, lines 38-55).

As per claim 35, Cypher disclose the method of claim 34, wherein providing a source

broadcast request from the first node comprises providing a source broadcast read

request from the first node, the method further comprising:

• Providing a read conflict response from the first node to the second node in

response to the pending broadcast read request of the second node, the read conflict

response from the first node indicating that the pending broadcast read request of the

second node conflicts with the source broadcast read request provided by the first node

(column 22, lines 1-40);

• Providing the requested data to the second node from the third node in response to

the pending broadcast read request of the second node (column 22, lines 45-67);

• Placing the data provided to the second node by the third node in a cache

associated with the second node (column 21, lines 12-36).

As per claim 36, Cypher discloses the method of claim 34, wherein providing a

broadcast request from the first node comprises providing a broadcast write request

from the first node, the method further comprising:

• Providing a second conflict response from the first node to the second node in

    response to the pending broadcast read request of the second node, the second

    conflict response from the first node indicating that the pending broadcast read

    request of the second node conflicts with the broadcast write request provided by

    the first node (column 18, lines 35-56);

• Preventing placement of the data in a cache associated with the second node in

response to the second conflict response provided by the first node (column 20, lines 22-39).

As per claim 37, Cypher discloses the method of claim 36, further comprising reissuing the source broadcast read request of the second node as a forward progress protocol read request for the data from the second node in response to the second conflict response provided by the first node (column 25, lines 1-30).

As per claim 38, Cypher disclose a computer system comprising a hybrid cache coherency protocol that employs source broadcast protocol mode and a forward progress protocol mode, the computer system being operative to fill a cache line associated with a source node with requested data provided in response to a source broadcast protocol mode request for the data when there is a source broadcast protocol read conflict with another node in the computer system, the computer system being further operative to reissue a request for the data from a source node using a forward progress protocol mode request for the data when there is a source broadcast protocol second conflict with another node in the computer system (column 27, lines 12-33, 55-67).
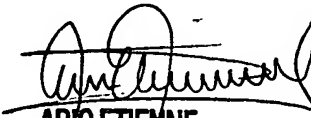
Conclusion

Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Barbara N. Burgess whose telephone number is (571)

272-3996. The examiner can normally be reached on M-F (8:00am-4:00pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Ario Ettinene can be reached on (571) 272-4001. The fax phone number for

the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the

Patent Application Information Retrieval (PAIR) system. Status information for

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Business Center (EBC) at 866-217-9197 (toll-free).

Barbara N Burgess
Examiner
Art Unit 2157

June 12, 2006

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